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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,738	10/28/2003	Paul Yager	128-02	6310
23713	7590	12/22/2004	EXAMINER	
GREENLEE WINNER AND SULLIVAN P C 4875 PEARL EAST CIRCLE SUITE 200 BOULDER, CO 80301			VALENTIN, JUAN D	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/696,738	YAGER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Juan D Valentin II	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 07 October 2004.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-71 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) 65-71 is/are allowed.  
 6) Claim(s) 1-9, 19-45 and 50-64 is/are rejected.  
 7) Claim(s) 10-18 and 46-49 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 07 October 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 10/21/2004.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 1-8, 19-22, 25-45, & 50-64 rejected under 35 U.S.C. 102(b) as being fully anticipated by Johansen (IPN WO 01/69209).

**Claim 1**

Johansen in conjunction with Fig. 9, a surface plasmon resonance sensor for sensing the refractive index of a probe region (pg. 9, line 16-pg. 10, line 18) comprising a polychromatic light source 800 for generating light propagating along an incident light propagation axis, a polarizer 870 in optical communication with said polychromatic light source 800 for selecting the polarization state of said light, an optical assembly 880, 883, 886 in optical communication with said polychromatic light source 800, said optical assembly comprising a dielectric layer 880, a dielectric sample layer 883 and a conducting layer (Fig. 2c, 220) positioned between said dielectric layer 880 and said dielectric sample layer 883, wherein illumination of said optical assembly with said light generates light propagating along a reflected light propagation axis, wherein a portion of said dielectric sample layer 883 adjacent to said conducting film (Fig. 2c, 220) comprises the probe region, a detector 920 in optical communication with said optical assembly 880, 883, ,886 for detecting said light propagating along said reflected light axis,

thereby sensing the refractive index of said probe region, and a selectively adjustable wavelength selector 860 positioned in the optical path between said light source 800 and said detector 920 for transmitting light having a distribution of transmitted wavelengths selected to generate surface plasmons on a surface of said conducting layer (Fig. 2c, 220) in contact with said dielectric sample layer 883, wherein the distribution of transmitted wavelengths is continuously tunable by adjustment of the selectively adjustable wavelength selector (pg. 6, line 28-pg. 7, line 26 & pg. 10, line 20-pg. 11, line 2).

**Claim 2**

Johansen as applied above, further discloses a light collection and focusing element 900, 910 positioned between said optical assembly 880, 883, 886 and said detector 920, said light collection and focusing element 900, 910 for collecting said light propagating along the reflected light propagation axis and focusing light propagating along the reflected light propagation axis onto said detector 920.

**Claim 3**

Johansen as applied above further discloses a collimating optical element 830, 840, 850 for collimating light from said polychromatic light source 800, wherein said collimating optical element 830, 840, 850 is positioned between said polychromatic light element 800 and said optical assembly 880, 883, 886.

**Claim 4**

Johansen as applied above further discloses where said collimating optical element 850 comprises a first lens 830, a pinhole 840, and a second lens 850 each positioned between said polychromatic light source 800 and said optical assembly 880, 883, 886.

**Claim 5**

Johansen as applied above further discloses wherein said selectively adjustable wavelength selector is positioned between said optical assembly and said detector (pg. 6, lines 3-5).

**Claim 6**

Johansen as applied above further discloses wherein said selectively adjustable wavelength selector 860 is positioned between said polychromatic light source 800 and said optical assembly 880, 883, 886.

**Claim 7**

Johansen as applied above further discloses wherein said selectable adjustable wavelength selector is an optical interference (pg. 11, lines 9-12, pg. 9, lines 6-11).

**Claim 8**

Johansen as applied above further discloses wherein optical interference filter is a Fabry-Perot Etalon (pg. 11, lines 9-12, pg. 9, lines 6-11).

**Claim 19**

Johansen as applied above further discloses wherein said distribution of transmitted wavelengths is characterized by a center wavelength and said center wavelength is tunable over a range of about 65 nm (pg. 10, lines 25-27).

**Claim 20**

Johansen as applied above further discloses wherein said distribution of transmitted wavelengths is characterized by a bandwidth and said band width has a value selected from the range of about 1 nm to about 100 nm (pg. 10, line 27).

**Claim 21**

Johansen as applied above further discloses wherein said selectively adjustable wavelength selector comprises a monochromator (pg. 10, line 20-pg. 11, line 2).

**Claim 22**

Johansen as applied above further discloses wherein said selectively adjustable wavelength selector comprises a spectrometer (pg. 2, lines 20-25).

**Claim 25**

Johansen as applied above further discloses wherein said detector is a charge coupled device (pg. 6, lines 6-9).

**Claim 26**

Johansen as applied above further discloses wherein said dielectric layer has a first refractive index, wherein said dielectric sample layer has a second refractive index which is less than said first refractive index and wherein said light propagating along said incident light propagation axis undergoes total internal reflection upon interaction with said optical assembly (pg. 1, lines 22-34).

**Claim 27**

Johansen as applied above further discloses wherein said dielectric sample layer is a sample provided by said flow cell (pg. 5, lines 22-25).

**Claims 28 & 29**

Johansen as applied above further discloses in conjunction with Fig. 2c, a flow cell 280 operationally connected to said optical assembly for introducing a sample into said probe region

and wherein said dielectric sample layer is a sample provided by said flow cell (pg. 7, lines 14-26).

**Claim 30**

Johansen as applied above further discloses wherein said conducting layer comprises a gold film (pg. 5, lines 19-21).

**Claim 31**

Johansen as applied above further discloses wherein said dielectric layer and said conducting layer comprises a waveguide (Fig. 2d, 300).

**Claim 32**

Johansen as applied above further discloses wherein said dielectric layer and said conducting layer are components of an optical fiber (pg. 5, lines 30-31 & pg. 6, lines 15-16).

**Claim 33**

Johansen as applied above further discloses a surface plasmon imagine device (pg. 5, lines 11-12).

**Claim 34**

Johansen as applied above further discloses wherein said light source is an incoherent light source (pg. 5, lines 26-29).

**Claim 35**

Johansen as applied above further discloses in conjunction with Fig. 2c, a microfluidic flow cell 280 operationally connected to said optical assembly for introducing a sample into said probe region (pg. 7, lines 14-26).

**Claim 36**

Johansen as applied above further discloses in conjunction with Fig. 2c, wherein said surface of said conducting layer in contact with said second layer comprises a side of said microfluidic flow cell (pg. 7, lines 21-26).

**Claim 37**

Johansen as applied above further discloses wherein said surface of said conducting layer is modified to provide for selective binding affinity (pg. 7, lines 14-26).

**Claim 38**

Johansen as applied above further discloses wherein said surface of said conducting layer in contact with said dielectric sample layer is modified to provide for selective adsorption characteristics (pg. 7, lines 14-26 & pg. 3, lines 27-30).

**Claims 39, 42, 43, 44, 45, 51, 52, 53, 55, 56, & 59**

The apparatus of Johansen as applied above with respect to claims 1, 6, 5, 7, 8, 26, 3, 2, 28, 37, & 35, respectively, can perform the methods as claimed by Applicant.

**Claims 40 & 41**

It is inherent that the apparatus disclosed by Johansen as applied above and in conjunction with Figs. 1b & 9 rotates the interference filter 860 systematically through first, second and third wavelength distributions in order to analyze the collected data i.e. spectral quality (reflectance) with computer 900 over the different distribution of wavelength bandwidths in order to improve system sensitivity i.e. spectral quality (pg. 3, lines 10-29).

**Claim 50**

Johansen as applied above further discloses wherein said step of passing light through a polarizer generates light having a p-polarization state propagating along said incident light propagation axis (pg. 8, lines 14-18).

**Claim 54**

Johansen as applied above further discloses wherein said light has wavelengths in the near infrared region of the electromagnetic spectrum (Fig. 12).

**Claims 57 & 58**

Johansen as applied above further discloses the step of flowing chemical species through said flow cell, thereby changing the refractive index of said probe region and the step of flowing chemical species through said flow cell, thereby changing the thickness of said probe region (pg. 7, lines 14-26 & pg. 9, lines 16-21).

**Claim 60**

The apparatus of Johansen as applied above with respect to claim 1 can perform the method as claimed by Applicant.

**Claim 61**

Johansen as applied above further discloses wherein the said detector is a charge coupled device (pg. 6, lines 6-7).

**Claim 62**

The apparatus of Johansen as applied above with respect to claim 1 can perform the method as claimed by Applicant. Further, it is inherent that the apparatus disclosed by Johansen as applied above and in conjunction with Figs. 1b & 9 rotates the interference filter 860 systematically through first, second and third wavelength distributions generating both reference

and analytical measurements in order to analyze the collected data i.e. spectral quality (reflectance) with computer 900 over the different distribution of wavelength bandwidths in order to detect a change in the refractive index of said probe region (pg. 3, lines 10-29, pg. 6, lines 20-22, & pg. 9, line 32-pg. 10, line 14).

**Claims 63 & 64**

Johansen as applied above further discloses wherein said optical assembly further comprises a flow cell (Fig. 2c, 280) for introducing chemical species into said probe region (pg. 7, lines 14-26).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen.

**Claim 9**

It is the position of the Office that even though the reference of Johansen does not specifically disclose the use of a linear interference filter, it does outline the importance of using an interference filter to filter out bands of selected wavelengths (pg. 9, lines 6-11). In light of the applicants disclosure, there is no critically distinguishing linear interference filter feature in the applicants disclosure that exemplifies novelty over prior art disclosure. Therefore producing the

same results as the Applicant's limitation, therefore the reference of Johansen reads on applicants claimed limitation.

***Allowable Subject Matter***

3. Claims 10-18 & 46-49 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Please see page 34-page 35 (first paragraph) for reasons for allowance of claims 10-18 and 46-49 in Applicants Remarks/Arguments dated 10/07/2004.

4. Claims 65-71 are allowed over prior art of record.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 65, the prior art fails to disclose or make obvious "determining a correction factor by measuring the ratio of the intensity of p-polarized light transmitted by said optical interference filter to s-polarized light transmitted by said optical interference filter having said tilt angle" and in combination with the other recited limitations of claim 65. Claims 66 & 67 are allowed by virtue of dependency on the allowed claim 65.

Regarding claim 68, the prior art fails to disclose or make obvious "determining a two-dimensional array of correction factors corresponding to said tilt angle by measuring the ratios of the intensity of p-polarized light transmitted by said optical interference filter to s-polarized light transmitted by said optical interference filter having said tilt angle for each element in said two-dimensional distribution of reflected light intensities" and in combination with the other recited limitations of claim 68. Claims 69-71 are allowed by virtue of dependency on the allowed claim 68.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

5. Applicant's arguments filed 10/07/2004 have been fully considered but they are not persuasive with regards to claims 1-8, 16, 17, 19-22, 25-45, & 50-64.

Regarding independent claims 1, 39, 60, & 62, and dependant claims 2-8, 19-22, & 25-38, 40-45, 50-59, 61, 63, & 64 (which depend from claims 1, 39, 60, & 62, respectively), it is the position of the Examiner that the amendment submitted 10/07/2004 does not place the application in condition for allowance. Applicant has argued that Johansen does not disclose, "wherein the distribution of transmitted wavelengths is continuously tunable by adjustment of the selectively adjustable wavelength selector" on pages 32-33 of the Remarks section dated 10/07/2004. Examiner understands the fundamental differences between the interference filter of Applicant and that taught by Johansen, but Examiner still feels that in the broadest interpretation of the claim as currently written, merely saying the wavelength selector is "continuously" tunable with out further defining continuously within the claim, is not enough to distinguish Applicants claimed limitations over the reference of Johansen. Johansen discloses a rotating filter wheel; this filter wheel can be rotated as needed throughout the experiment to achieve the desired center wavelength selection. In the broadest sense of the word "continuously", the filter wheel of Johansen can be "continuously" rotated as needed throughout the two-dimensional

imaging surface plasmon resonance process until the experiment has concluded. While Johansen shows a filter wheel with five interference filters in Fig. 8b, that number could be higher or lower depending on the wavelength range selected and the desired center wavelength difference between interference filters on the wheel. Therefore, as currently drafted, Examiner maintains the rejection above with regards to independent claim 1.

Regarding dependant claims 21 & 22, the Examiner maintains the rejections as shown applied above with regards to these claims. It is the view of the Office that the pinhole 840 and filter wheel 860 together act as a monochromator, by isolating the on coming light and functioning to provide a narrow spectrum of light to emit onto the sample surface being measured. Further, it is believed that the passage cited within Johansen (pg. 2, lines 20-25) disclose a spectrometer, i.e. an inspection system that uses a detector to measure the distribution of radiation in a particular wavelength region. While not using the explicitly using the terminology monochromator or spectrometer, Johansen provides structure and insight that provide the same functions of a monochromator or spectrometer as shown above.

Regarding dependant claims 31 & 32, the Examiner maintains the rejections as shown applied above with regards to these claims. Applicant has not shown in the specification or the claims how the dielectric and conducting layers of Applicants invention distinguish themselves from other SPR imaging apparatus' with regards to the claimed waveguide features. Merely stating that the two layers together form a waveguide does not distinguish over prior art that has the same structure and performs the same functions as that of Applicants invention. This can be seen by the rejection maintained above with regards to claims 31 & 32. While drawing reference 300 in Fig. 2d is disclosed as a transparent substrate, it is also a dielectric layer that is needed to

be coupled to the conducting layer 220 in order to provide the excitation of surface plasmons when light photons of incident radiation are absorbed in to the conducting layer. This phenomena as discussed is well known to someone of ordinary skill in the art and as shown in paragraph two on page six of Exhibit A submitted by Applicant on 10/07/2004.

The combination of Johansen in view of Johnson with regards to claim 9 is maintained because it depends from independent claim 1 that has not been amended to read over the prior art used to reject claim 1 as shown above.

*Conclusion*

**6. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

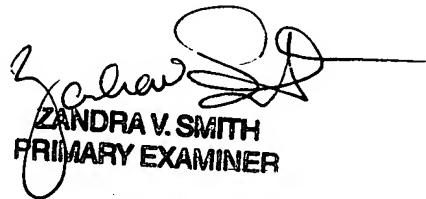
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan D Valentin II whose telephone number is (571) 272-2433. The examiner can normally be reached on Mon.-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Juan D Valentin II  
Examiner 2877  
JDV  
December 20, 2004



Sandra V. Smith  
PRIMARY EXAMINER